

## CLAIMS

1. Process for the production of an assembly comprising several silicone elements crosslinked by the polyaddition of  $\equiv\text{Si-H}$  units onto  $\equiv\text{Si-alkenyl}$  (preferably  $\equiv\text{Si-vinyl}$ ) units, said elements adhering firmly to one another, characterized in that it comprises the following essential steps:
  - (I) forming a silicone element (i) with a liquid silicone preparation (i) comprising:
    - polyorganosiloxanes (POS) A with  $\equiv\text{Si-alkenyl}$  (preferably  $\equiv\text{Si-vinyl}$ ) units,
    - 10 • polyorganosiloxanes (POS) B with  $\equiv\text{Si-H}$  units,
    - at least one metal catalyst C, preferably based on platinum,
    - optionally at least one POS resin D carrying  $\equiv\text{Si-alkenyl}$  (preferably  $\equiv\text{Si-vinyl}$ ) units,
    - optionally at least one crosslinking inhibitor E,
    - 15 • optionally at least one adhesion promoter F,
    - optionally at least one mineral filler G,
    - optionally at least one functional additive H for imparting specific properties,
  - (II) crosslinking the liquid silicone preparation (i) formed in step (I), the composition
    - 20 of this preparation and the crosslinking conditions being chosen in such a way that the crosslinked silicone element (i) has a surface density SD of unreacted, residual alkenyl (preferably vinyl) groups, per  $\text{nm}^2$ , defined as follows:
 
$$\text{SD} \geq 0.0015,$$

preferably  $\text{SD} \geq 0.0030,$

    - 25 and particularly preferably  $0.0100 \geq \text{SD} \geq 0.0040.$
  - (III) optionally repeating steps (I) and (II) n times (n = positive integer) to give n elements (i) that adhere to one another,
  - 30 - (IV) forming a silicone element (ii) by a process which consists in bringing the crosslinked silicone element or last crosslinked silicone element (i) into contact with a liquid silicone preparation (ii) comprising:
    - polyorganosiloxanes (POS) A' with  $\equiv\text{Si-alkenyl}$  (preferably  $\equiv\text{Si-vinyl}$ ) units,
    - polyorganosiloxanes (POS) B' with  $\equiv\text{Si-H}$  units,
    - 35 • at least one metal catalyst C', preferably based on platinum,
    - optionally at least one POS resin D' carrying  $\equiv\text{Si-alkenyl}$  (preferably  $\equiv\text{Si-vinyl}$ ) units,
    - optionally at least one crosslinking inhibitor E',

- optionally at least one adhesion promoter F',
- optionally at least one mineral filler G',
- optionally at least one functional additive H' for imparting specific properties,

5 - (V) crosslinking the liquid silicone preparation (ii) formed in step (III) to give the crosslinked silicone element (ii) that adheres to the element or last element (i).

2. Process according to claim 1, characterized in that the ratio R of the  $\equiv\text{Si-H}$  units to the  $\equiv\text{Si-alkenyl}$  (preferably  $\equiv\text{Si-vinyl}$ ) units in the selected liquid silicone preparation (i) is defined as follows:

$$R \leq 1,$$

$$\text{preferably } 0.80 \leq R \leq 0.98.$$

3. Process according to claim 2, characterized in that the selected liquid silicone preparation (i) comprises at least one hyperalkenylated (preferably hypervinylated) POS A providing  $\equiv\text{Si-alkenyl}$  (preferably  $\equiv\text{Si-vinyl}$ ) units, whose content is greater than or equal to at least 2% by number, preferably greater than or equal to at least 3% and particularly preferably between 3 and 10% by number, the  $\equiv\text{Si-alkenyl}$  (preferably  $\equiv\text{Si-vinyl}$ ) units advantageously being carried essentially by siloxy units D:  $-\text{R}_2\text{SiO}_{2/2}-$ .

4. Process according to any one of claims 1 to 3, characterized in that:

- the assembly produced comprises a preferably flexible substrate and several crosslinked silicone elements forming a multilayer coating adhering to the substrate;
- and:

25 • step (I) consists in applying the liquid silicone preparation (i) to the substrate to form a crosslinked silicone layer (i),

• and step (IV) consists in applying the liquid silicone preparation (ii) to the crosslinked silicone layer or last crosslinked silicone layer (i) carrying residual reactive groups on the surface, to form a crosslinked silicone layer (ii).

5. Process according to any one of claims 1 to 4, characterized in that the assembly produced is a silicone mold or molded object.

6. Process according to any one of claims 1 to 5, characterized in that steps (IV) and 35 (V) are only carried out after a prolonged interruption of the process.

7. Process according to claim 4, characterized in that the second and last liquid silicone preparation is identical to or, preferably, different from the first and, particularly

preferably, is devoid of hyperalkenylated POS A°.

8. Process according to any one of claims 1 to 7 wherein the chosen POS (A & A') have siloxy units of the formula



in which:

- the symbols W, which are identical or different, are each an alkenyl group and preferably a C<sub>2</sub>-C<sub>6</sub> alkenyl;
- the symbols Z, which are identical or different, are each a non-hydrolyzable monovalent hydrocarbon group that is devoid of an unfavorable action on the activity of the catalyst, is optionally halogenated and is preferably selected from alkyl groups having from 1 to 8 carbon atoms inclusive, and from aryl groups;
- a is 1 or 2, b is 0, 1 or 2 and a + b is between 1 and 3;
- optionally at least some of the other units are units of the empirical formula



in which Z is defined as above and c has a value of between 0 and 3.

9. Process according to any one of claims 1 to 8 wherein the chosen POS (B & B') have siloxy units of the formula



in which:

- the symbols L, which are identical or different, are each a non-hydrolyzable monovalent hydrocarbon group that is devoid of an unfavorable action on the activity of the catalyst, is optionally halogenated and is preferably selected from alkyl groups having from 1 to 8 carbon atoms inclusive, and from aryl groups;
- d is 1 or 2, e is 0, 1 or 2 and d + e has a value of between 1 and 3;
- optionally at least some of the other units being units of the empirical formula



in which L is as defined above and g has a value of between 0 and 3.

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10. Process according to any one of claims 1 to 9, characterized in that the alkenyl groups W of the POS (A & A') and/or of the POS resins (D & D') are vinyl groups Vi carried by siloxy units D and optionally M and/or T.

35 11. Liquid silicone formulation which can be used especially as a liquid silicone preparation (i) in the process according to any one of claims 1 to 10, and which comprises:

- polyorganosiloxanes (POS) A with ≡Si-alkenyl (preferably ≡Si-vinyl) units,
- polyorganosiloxanes (POS) B with ≡Si-H units,

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preferably  $0.80 \leq R \leq 0.98$ .

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